18. (a) How are various carbonyl compounds differentiated using mass spectrometry? (5)

(b) State and explain axial halo ketone rule and mention its applications. (5)

19. Discuss the thermal and photocyclisation of 1,3,5–hexatriene to give cyclohexadiene by correlation diagram approach.

20. (a) Discuss any two synthetic methods of synthesizing anthocyanin derivatives. (4)

(b) How to convert cholesterol into testosterone? (6)

NOVEMBER/DECEMBER 2023

DCH31/GCH31 — ORGANIC CHEMISTRY – III

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

INDUSTRIES ARTS & SCIENCE COLLEGE
LIBRARY

1. What are the electronic transitions expected for benzene and benzaldehyde?

2. Mention any two applications of fingerprint region.

3. What is the importance of Larmour frequency?

4. What are internal standards used in NMR?

5. What is mean by chemical ionisation? Mention any one application of it.

6. Give the fragmentation pattern of acetic acid.

7. What is meant by intersystem crossing?

8. Give an example for [3,3]-sigmatropic rearrangement.

9. Draw the structure of progesterone and estrone.

10. What are purine bases? Give the structure of adenine and guanine.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Discuss the factors affecting UV-Vis absorption band.

Or

(b) Write a note on Woodward-Fiser rule for conjugated dienes.

12. (a) Predict the number of proton and carbon signals, chemical shift, and multiplicity for 2-pentanone and methyl acetate.

Or

(b) Explain the role of proton decoupling in NMR spectroscopy.

13. (a) How does the stability of carbocations and aromaticity affect the fragmentation pattern of aliphatic and aromatic hydrocarbons?

Or

(b) Write a note on McLafferty rearrangement.

RIES ARTS & SCIENCE COLLEGE
LIBRARY

14. (a) What are sigmatropic rearrangements? Explain Cope and Claisen rearrangement.

Or

(b) Explain the following reactions with example

(i) Photo reduction, and

(ii) Photocyclisation.

15. (a) Explain the synthesis of Vitamin Al using Witting and Reformatsky method.

Or

(b) Write a note on the synthesis of pyrimidine bases.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. (a) How does conjugation affect the vibrational frequency of carbonyl groups in IR speetroscopy? (5)

(b) How to differentiate inter and intramolecular hydrogen bonding using IR spectroscopy? (5)

17. (a) Discuss geminal and vicinal coupling in ^{1}H NMR spectroscopy with examples. (5)

(b) Write a note on factors affecting ^{13}C NMR chemical shifts. (5)